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ABSTRACT

An issue facing researchers who study very select populations is how to obtain reliability estimates on instruments. When the populations and resulting samples are very small and select, the ability to obtain reliability estimates becomes very difficult. As a result, many researchers ignore reliability concerns and forge ahead with data collection. In response to this concern, concepts associated with the model of social cognition of A. Bandura and the model of systematic desensitization of J. Wolpe were applied to 90 undergraduates who completed the 10-item, Likert-type Communication Satisfaction Scale (CSS). The CSS is designed to assess the attitudes of intubated patients in a hospital intensive care unit. The purpose of this study was to explore the potential use of imagery and social cognition to estimate instrument reliability for very selective samples. Stimuli (text, auditory, and visual) were provided to enable subjects to imagine being an intubated patient. Internal reliability calculations (Cronbach's alpha index) revealed an estimate of 0.83 for the entire scale. The results are discussed within a social cognition and a measurement framework. These results may have profound implications for estimating instrument reliability that cannot be tested feasibly in large samples prior to implementation. While the resulting reliabilities cannot be directly applied to the intubated sample, the procedure may provide critical feedback to researchers and instrument developers prior to the actual administration of the instrument. The CSS is included.
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Applying Social Cognition to Address Measurement Problems in Research:

An attempt to address reliability issues with small samples.

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Running head: Social Cognition and Reliability

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Abstract

One of the issues facing researchers studying very select populations is how to obtain reliability estimates on instruments. When the populations and resulting samples of studies are very small, and select, the ability to gather data for typical reliability estimates becomes very difficult. As a result, many researchers ignore the reliability concerns of their instrumentation and forge ahead collecting data. In response to this concern, the concepts associated with Bandura's model of social cognition and Wolpe's model of systematic desensitization, were applied to a group of 90 undergraduates completing a Communication Satisfaction Scale designed to assess the attitudes of intubated patients in a hospital Intensive Care Unit. Stimuli (text, auditory and visual) were provided to enable the subjects to imagine what it is like to be an intubated patient. The subjects were then presented a 10 item Likert scale focusing on the communication issues of intubated patients. Internal reliability calculations (Cronbach's alpha index) revealed an estimate of 0.83 for the entire scale. The results are discussed within both a social cognition and a measurement framework. These results may have profound implications for estimating the reliability of scales and instruments that cannot feasibly be tested on large samples prior to implementation. While the resulting reliabilities cannot be directly applied to the intubated sample, the procedure may provide critical feedback to researchers and instrument developers prior to the actual administration of the instrument with the research sample.

**Applying Social Cognition to Address Measurement Problems in Research:
An attempt to address reliability issues with small samples**

Introduction

One of the problems facing researchers in fields in which very select subjects are used is estimating the reliability of instruments. Generally, instruments may be developed or adapted for a specific purpose and then administered to a separate sample of subjects to obtain reliability estimates. The sample is ordinarily very similar to the target group that the instrument will be used with. The instrument is then edited and readministered to new samples until it is judged reliable. Then, the researcher conducts the research project administering the instrument with confidence that it is reliable, assuming that the instrument has appropriate validity.

Unfortunately, many fields of research focus on select groups that, although they may be small in total number, are important to a specific field of study. For instance, in the medical field patients with specific symptoms or diseases may be of interest. However, the number of these patients typically occurring may not be large enough to obtain the standard reliability estimates prior to conducting the actual study: There may be only 20-30 of these patients in an urban hospital each year. Often, these instruments are developed, reviewed by experts and then administered to the research sample without any prior estimates of reliability because the researcher cannot obtain sufficiently large samples of 80 to 100 subjects with the specific attribute to obtain reliability estimates, and then obtain a new group of sufficient size for the actual research study. Therefore, many times instruments are used without any estimate of reliability.

Intubation

Intensive respiratory care is a relatively new medical treatment for patients suffering from acute respiratory failure. The first oral and endotracheal tubes were used in conjunction with a bellows to aid drowning victims in the early nineteenth century. Pneumothorax was a common side effect of vigorous bellowing and the Royal Humane Society recalled all tubes and bellows. It was not until the early twentieth century that interest in intubation and mechanical ventilation was renewed (Hilberman, 1975).

In 1913, Janeway invented a patient-triggered pressure cycled ventilator, but it was not until forty-nine years later that physiological principles and mechanical devices were used to treat respiratory failure in victims of poliomyelitis. Mortality from respiratory paralysis decreased from 79% in 1946 to 17% in 1949 with the use of the Drinker-Collins Tank Respirator (Hilberman, 1975). The first mechanical respirator, the Engstrom, was used successfully in Copenhagen to treat poliomyelitis induced respiratory failure. This respirator required that the patient have a tracheotomy with insertion of a cuffed endotracheal tube. This type of artificial ventilation saved those victims unresponsive to tank ventilation and mortality was reduced from 87% to just under 40% (Clochesy, 1989; Hilberman, 1975).

Since these firsts in respiratory care, great strides have been made in understanding respiratory physiology and in the development of microprocessor technology. Today, there are several respirators that offer six or more ventilatory modes plus a variety of functions and monitoring capabilities (Medina, 1989).

Despite all these advances, research conducted on patients' perceptions of their experience being mechanically ventilated has shown that the inability to communicate is a major patient and nursing problem (Fitch, 1987; Gries & Fernsler, 1988; Riggio, Singer, Hartman & Sneider, 1982). These patients are denied the use of speech and are

totally dependent on nursing for their physical needs. Some patients are able to write but for the majority of patients other forms nonverbal communication such as gestures are their only alternative. Nonverbal communication is very individualistic and is subject to frequent misinterpretation and/or total failure to communicate (Fitch, 1987; Gries & Fernsler, 1988; Riggio, Singer, Hartman, & Sneider, 1982).

In response to the concern about the communication of intubated patients, Apple-Hardin (1984) suggests that a board using pictures and simple phrases would facilitate communication for intubated patients. Therefore, a study focusing on the differences in attitudes between patients using a structured communication board and spontaneous communication techniques is need.

Social Cognition

One method for obtaining an estimation of the reliability of instruments designed for very select groups involves the social cognitive theory of Bandura (1986) and the systematic desensitization model of Wolpe (Wolpe & Lazarus, 1966; 1973). Bandura's (Bandura, 1977; Bandura, Ross & Ross, 1963; Bandura & Walters, 1963) work with imitation learning and vicarious reinforcement laid the foundation for the current model of social cognition (Bandura, 1986). Bandura's finding that subject's behavior may change as a result of observing a model performing a behavior and receiving a reinforcer revolutionized the field of behavioral analysis, establishing the important role of the cognitive component in learning.

Bandura's incorporation of cognition into the principals of his model of learning is exemplified by the following statement:

> The remarkable capacity to use symbols, which touches virtually every aspect of people's lives, provides them with a powerful means of altering and adapting to their environment. Through symbols people process and transform transient experiences into internal models that serve as guides for future action. (Bandura, 1986, p. 18.)

Bandura believes that "... By drawing on their knowledge and symbolizing powers, people can generate innovative courses of action" (Bandura, 1986, p. 18). This suggests that it may be possible for people to imagine themselves in specific modeled situations and react as if they were in that situation. Bandura (1986) further states:

> In actuality, virtually all learning phenomena, resulting from direct experience can occur vicariously by observing other people's behavior and its consequences for them. The capacity to learn by observation enables people to acquire rules for generating and regulating behavioral patterns without having to form them gradually by tedious trial and error. (p. 19)

Bandura (1986) suggests that a person may be able to observe a person and model the response pattern of that person through abstract modeling if they have been provided concrete examples and the appropriate concepts;

> In observational learning of difficult concepts, abstract modeling of rules is aided by providing concrete referents in conjunction with conceptual expressions. (p. 101)

Bandura's social cognition theory seems to suggest that it may be possible to provide appropriate referents, cues and a conceptual framework to enable observers to abstract the rules and response pattern of another person. And, that the abstracted response pattern (both cognitive processing and behavioral performance) may be very similar to that of the observed group.

Systematic Desensitization

Wolpe's (Wolpe, 1982; Wolpe & Lazarus, 1966; 1973b) work with neurotic patients employing systematic desensitization has demonstrated the effective use of imagery and cognition in treating a variety of common fears. This technique is strongly tied to the social learning model, focusing on the cognitions and behaviors of people.

Typically, the procedure involves a person imagining increasingly fearful or difficult situations coupled with relaxation techniques. The gradual increases in the target stimuli removes the threshold that is usually associated with the problem situation. After a short

amount of time, the client usually is better able to deal with his/her fear of heights. This technique requires the subject to imagine the entire situation and has been successfully used with a wide variety of behaviors and conditions.

Wolpe's research has demonstrated that subjects are very capable of imagining themselves in different situations when provided the appropriate verbal stimuli and that systematic desensitization procedures provide a symbolic environment when the actual environment is either not practical or not feasible.

Putting the Pieces Together

The present study investigated the use of a combination of systematic desensitization and social cognition with a sample of undergraduates in an attempt to replicate the conditions of a specific group, patients intubated for 2 days or more, in order to obtain an estimate of instrument reliability.

The typical 300-400 bed urban hospital may have only 100-150 intubated patients per year. Only a fraction of these patients would have been intubated for more than 24 hours, would remember the procedure (because of anesthesia), and would be physically and mentally able to complete an attitude survey or instrument. Approximately 40 to 50 patients may have the characteristics described above during the span of a year at an urban hospital, thereby severely restricting the instrument development phase. The unfortunate outcome of these types of restrictions, which are common in medical research and other fields focusing on very select samples, is the development and administration of a research instrument without an estimate of the instrument's reliability. This results from working with samples that may take years to accumulate a sufficient number for reliability estimates if instrument revision is necessary.

Methods

Sample

The sample consisted of 90 male and female undergraduates at a major Northeastern University. The procedures were administered in a group setting. All subjects indicating that they have had a personal experience with the intubation procedure were eliminated from the study.

Procedure

The sample was informed that they were about to participate in a unique experiment and that it was important that they attempt to imagine themselves as an intubated patient. The intubation procedure and purpose of the procedure were explained to the subjects. The intubation procedure was explained as follows:

> "... Intubation is a procedure in which a tube approximately 1/2 inch in diameter and 10 inches in length is inserted through the patient's mouth into the trachea. The purpose of this tube is to assist the patient's breathing through mechanical devices."

These instructions were provided in print to the subjects as well as read to them. After the subjects heard the description, a schematic diagram of the intubation procedure was presented to them on an overhead projector. Following the schematic, an overhead photograph of an actual intubated patient was presented while the subjects completed a 10 item scale focusing on issues of communication while intubated. Subjects were asked to imagine that they had required surgery and that they had to be intubated. They were to imagine that they had just been intubated for approximately three (3) days.

Instrumentation

The instrument administered to the subjects was a 10 item Likert scale focusing on issues related to communication problems between intubated patients and medical staff. The instrument was developed by the first author, an experienced intensive care

nurse. The instrument was reviewed for content validity by two experts in the field of intensive care nursing with considerable experience working with intubated patients. The Communication Satisfaction Scale is presented in Appendix A.

Results

The responses of the 90 subjects to the Communication Satisfaction Scale were subjected to a reliability analysis. The analysis revealed a Coefficient Alpha of 0.83 (Cronbach, 1951). This reliability estimate suggests, that for this sample, the Communication Satisfaction Scale has adequate internal reliability.

Conclusions

The purpose of this study was to explore the potential use of imagery and social cognition as a procedure for obtaining an estimate of instrument reliability for very selective samples. The results of the reliability analysis suggest that this procedure may provide an alternative to ignoring the reliability issues related to instruments designed for small select groups. However, the actual viability of this procedure cannot be completely assessed until the instrument has also been administered to a sample of intubated patients.

These results of this study may have profound implications for estimating the reliability of scales and instruments that cannot feasibly be tested on large samples prior to implementation. While the resulting reliabilities cannot be directly applied to the intubated sample, the procedure may provide critical feedback to researchers and instrument developers prior to the actual administration of the instrument with the research sample. The use of social cognition and imagery may provide researchers with a theoretically sound basis for obtaining initial estimates of reliability for special

populations.

Future research should focus on the relationship among the responses of the actual sample and the "simulated sample", those subjects imagining themselves as members of a special group. Future investigations should also incorporate Bandura's (1986) concepts of self-efficacy and self-motivation as they relate to cognitive and behavioral changes and outcomes.

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Appendix A

COMMUNICATION SATISFACTION SCALE

Respond to each of the following ten (10) statements using the scale below. *Circle your answer.*

SA = Strongly Agree
A = Agree
? = Not Sure
D = Disagree
SD = Strongly Disagree

1. I felt frustrated at **not** being able to speak while the tube in place.

SA A ? D SD

2. Even with the tube in place, I was able to make my needs known.

SA A ? D SD

3. There were many times when I could not make my needs known.

SA A ? D SD

4. It **did not** bother me that I could not talk when the tube was in place.

SA A ? D SD

5. When the tube was in place, people had a hard time understanding what I wanted to tell them.

SA A ? D SD

6. I found it easy to communicate my physical needs (i.e., need for bedpan or need to change position).

SA A ? D SD

7. I felt frustrated when I was trying to express myself to others.

SA A ? D SD

8. I **did not** need to communicate while the tube was in place.

SA **A** **?** **D** **SD**

9. I became discouraged because I was not able to communicate.

SA **A** **?** **D** **SD**

10. I felt more dependent on others because I could not communicate effectively.

SA **A** **?** **D** **SD**

Thank you for your cooperation.